Test Report:	3W06712
Applicant:	Northern Airborne Technology #14-1925 Kirschner Road Kelowna B.C. V1Y 4N7
Equipment Under Test: (EUT)	NAT NTX403 UHF Transceiver
In Accordance With:	**FCC Part 22,90**
Tested By:	Nemko Canada Inc. 303 River Road, R.R. 5 Ottawa, Ontario. K1V 1H2
Authorized By:	Russell Grant, Senior Approvals Eng.
Date:	17 March 2003
Total Number of Pages:	36

Table of Contents

Section 1. Summary of Test Results

General

All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 22, 90.

☒	New Submission	☒	Production Unit
☐	Class II Permissive Change	☐	Pre-Production Unit

T	N	B	Equipment Code

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. NONE
See " Summary of Test Data".

TESTED BY: _____ DATE: 17 March 2003
Glen Westwell, Wireless Technologist

Summary Of Test Data

Name Of Test	Para. No.	Result
RF Power Output	2.1046	Complies
Audio Frequency Response	2.1047	Complies
Modulation Limiting	2.1047	Complies
Occupied Bandwidth	2.1049	Complies
Spurious Emissions at Antenna Terminals	2.1051	Complies
Field Strength of Spurious Emissions	2.1053	Complies
Frequency Stability	2.1055	Complies
Transient Frequency Behavior	90.214	Complies

Indoor Temperature: 20°C
Humidity: 20 %

Outdoor Temperature: -10°C
Humidity: 22 %

.

Section 2. General Equipment Specification

Manufacturer:	Northern Airborne Technology
Model No.:	NTX403 UHF Transceiver
Serial No.:	
Date Received In Laboratory:	Jan 6, 2003
Nemko Identification No.:	1
Primary Power:	120V/60Hz
Modulation:	FM
Emission Designator:	16K0F3E (wide band) 11K0F3E (narrow band)
Power Output:	1.0 Watt (30dBm) 10Watt (40dBm)
Channel Spacing:	25 kHz – Wide Band 12.5KHz – Narrow Band
Frequency Range:	Part 22.805, General Aviation Air-Ground Airborne Mobile 459.700 – 459.975MHz Part 90, Subpart I (90.203(j)) 421-512MHz

Section 3. RF Power Output

Para. No.: 2.1046

Test Performed By: Glen Westwell	**Date of Test: Jan 6, 2003**

Minimum Standard: 1 dB

Test Results: Complies

Measurement Data:

Conducted Power	Rated (dBm)	Measured (dBm)	Delta (dB)
High Band	30.0	30.4	0.4
High Band	40.0	40.9	0.9
Mid Band	30.0	30.6	0.6
Mid Band	40.0	40.7	0.7
Low Band	30.0	30.8	0.8
Low Band	40.0	40.5	0.5

Section 4. Audio Frequency Response

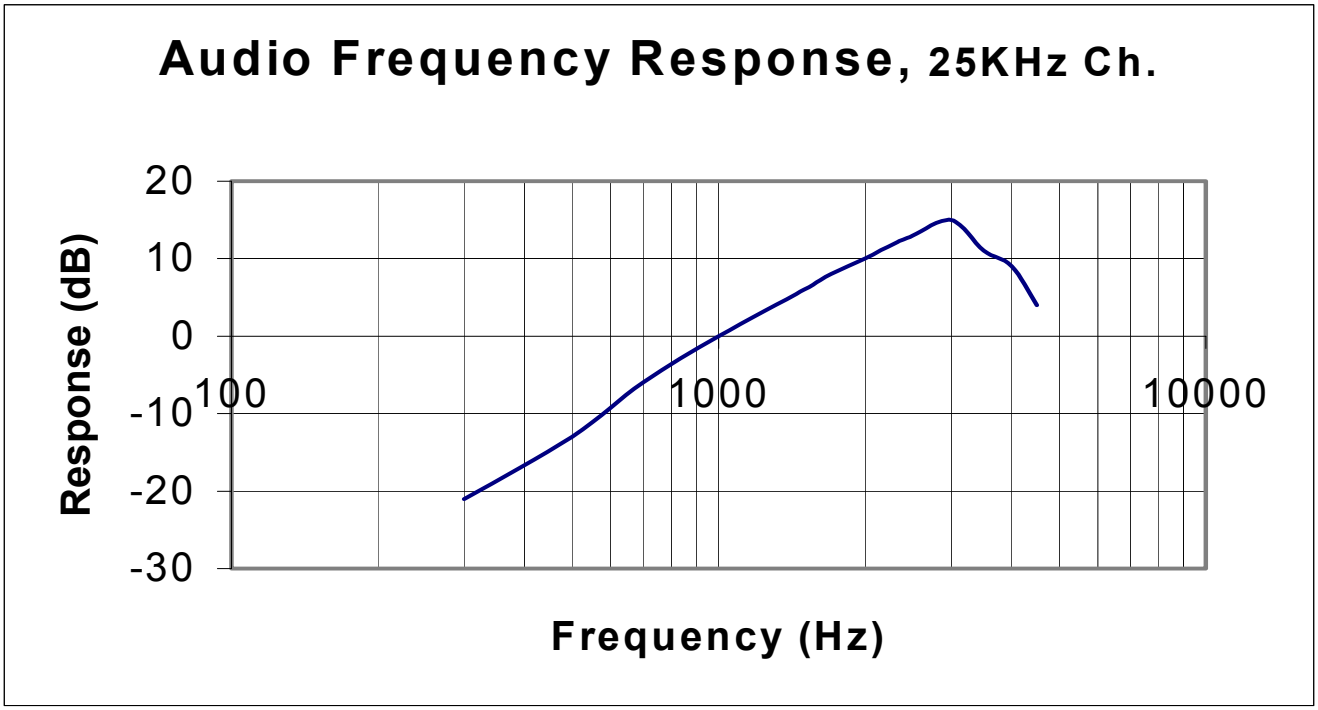
Para. No.: 2.1047

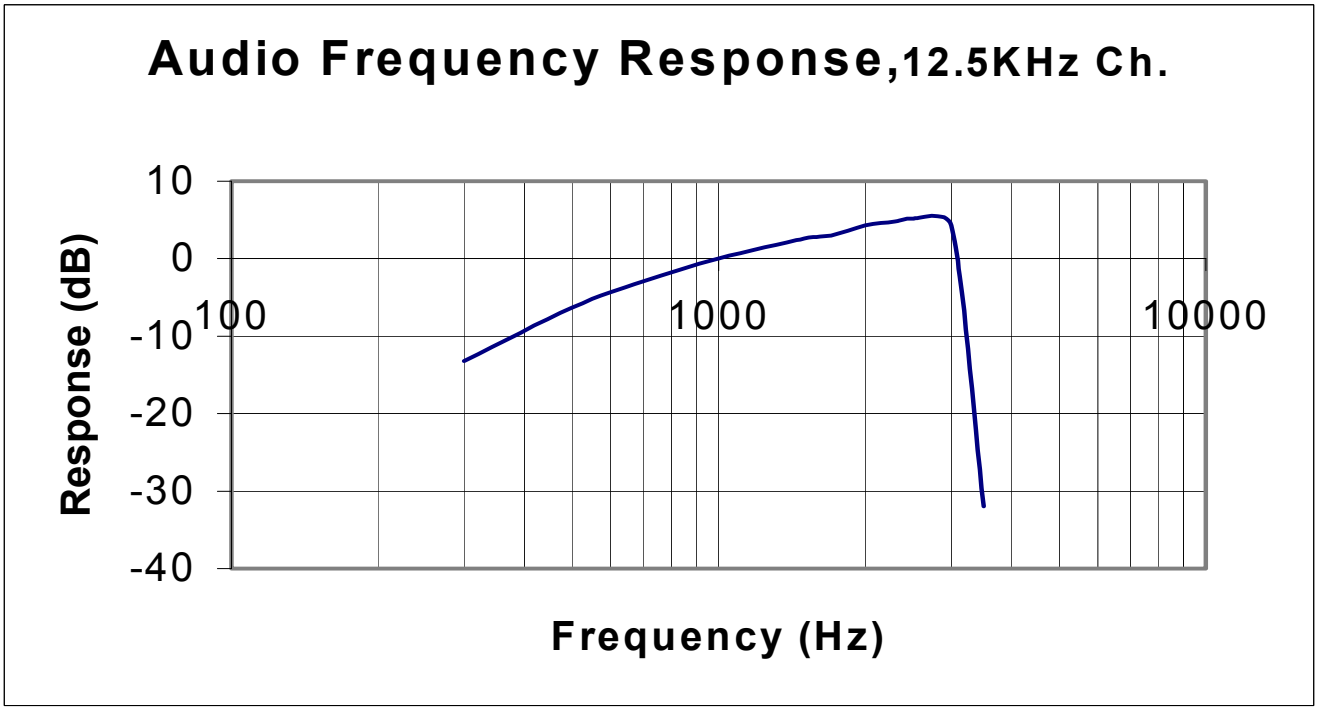
Test Performed By: Glen Westwell	**Date of Test: Jan 9, 2003**

Minimum Standard: N/A

Test Results: Complies

Measurement Data: See attached graph.


Audio Frequency Response, 25KHz Ch.
Response (dB)
20
10
0
-10
-20
-30
100
1000
10000
Frequency (Hz)


Audio Frequency Response,12.5KHz Ch.
Response (dB)
10
0
-10
-20
-30
-40
100
1000
10000
Frequency (Hz)

Section 5. Modulation Limiting

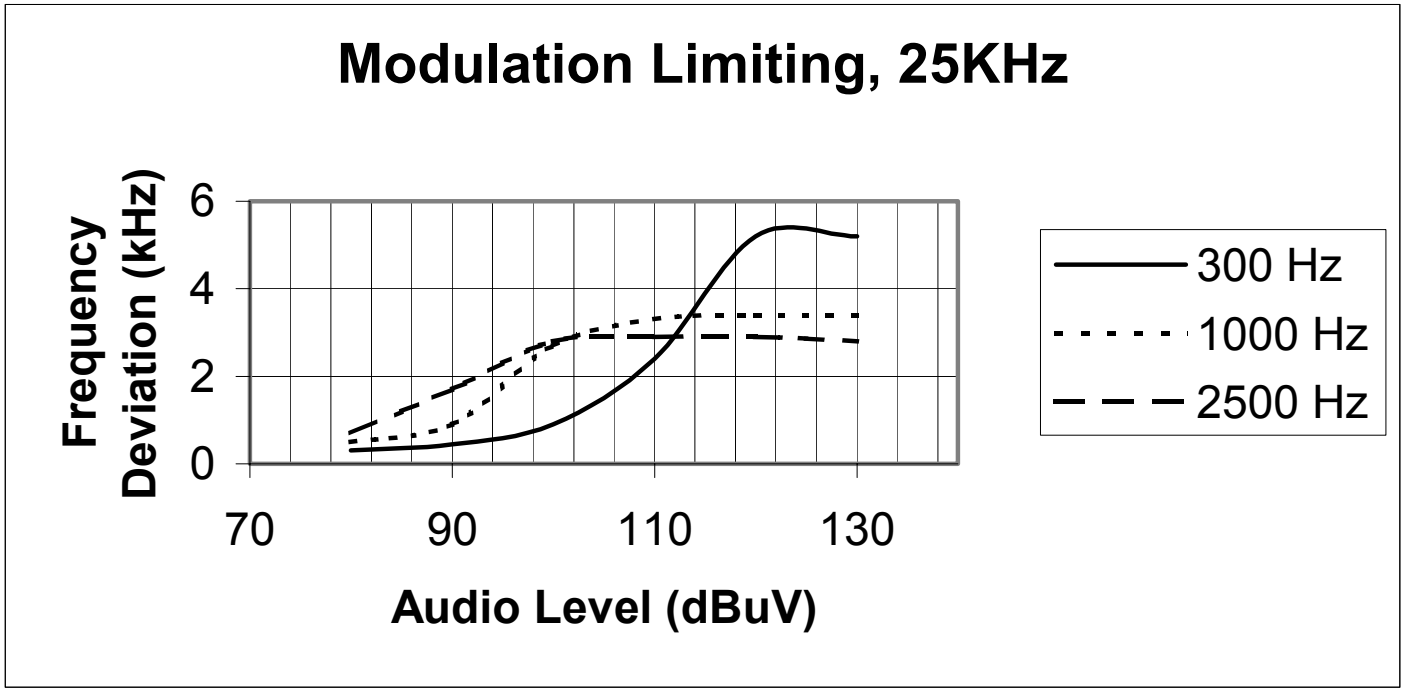
Para. No.: 2.1047

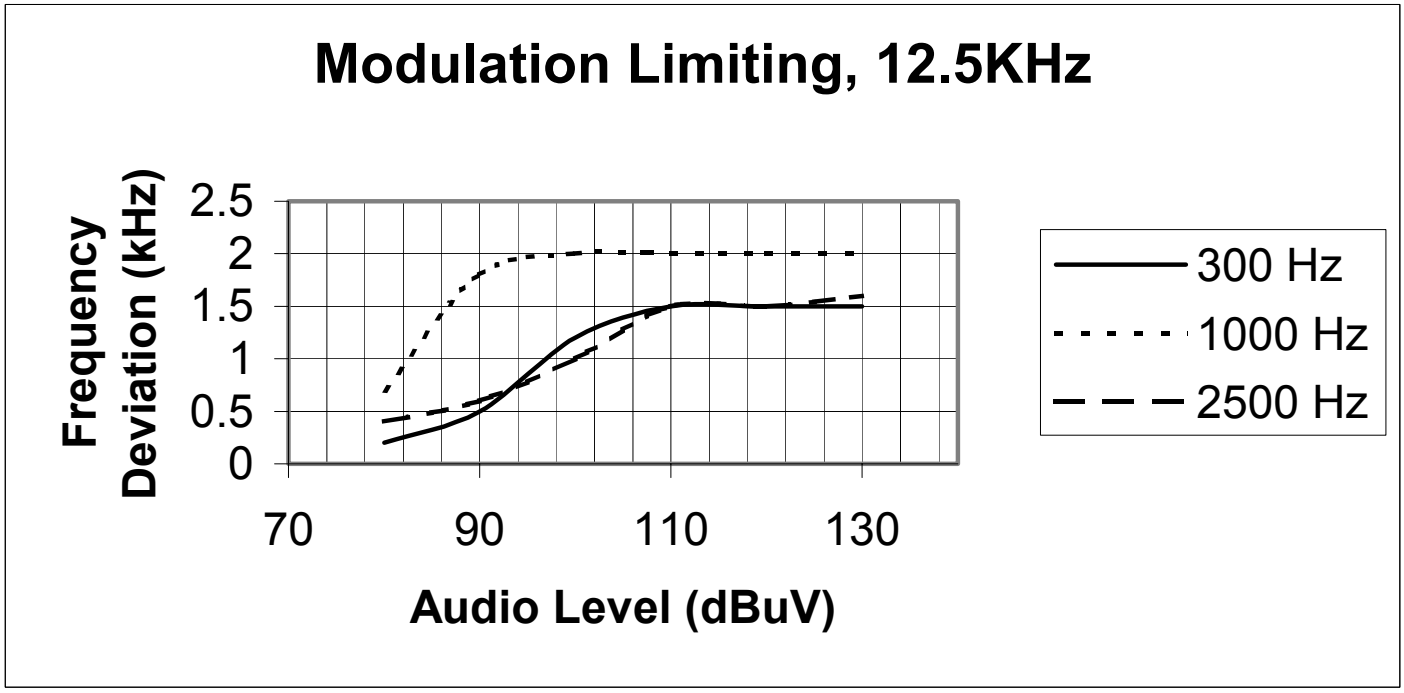
Test Performed By: Glen Westwell	**Date of Test: Jan 9, 2003**

Minimum Standard: N/A

Test Results: Complies

Measurement Data: See attached graph.


Modulation Limiting, 25KHz
Frequency Deviation (kHz)
6
4
2
0
70
90
110
130
Audio Level (dBuV)
300 Hz
1000 Hz
2500 Hz


Modulation Limiting, 12.5KHz
Frequency Deviation (kHz)
2.5
2
1.5
1
0.5
0
70
90
110
130
Audio Level (dBuV)
300 Hz
1000 Hz
2500 Hz

Section 6. Occupied Bandwidth

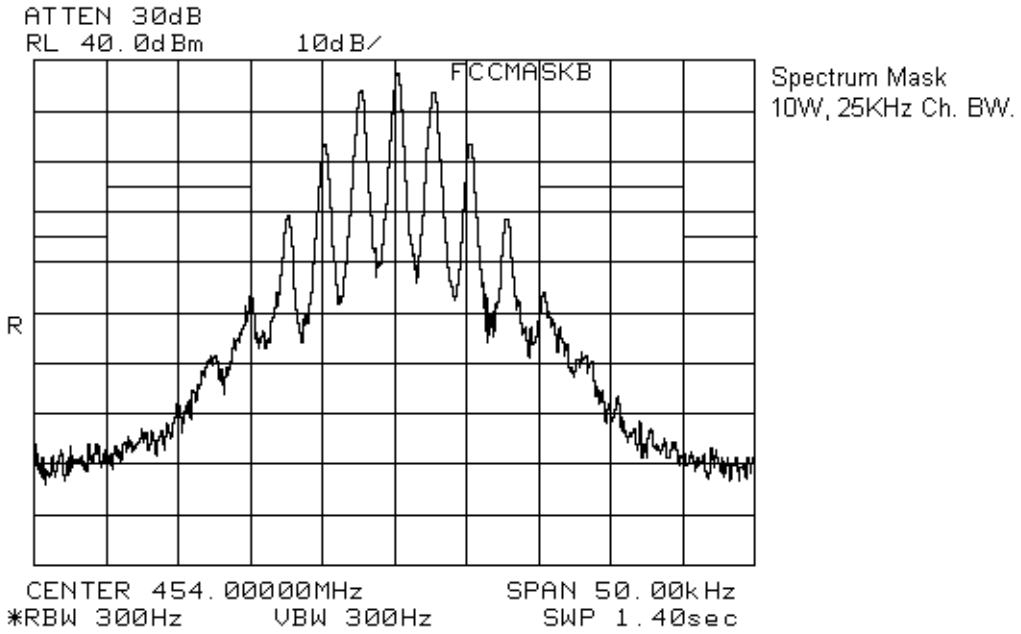
Para. No.: 2.1049

Test Performed By: Glen Westwell	**Date of Test: Mar 13, 2003**

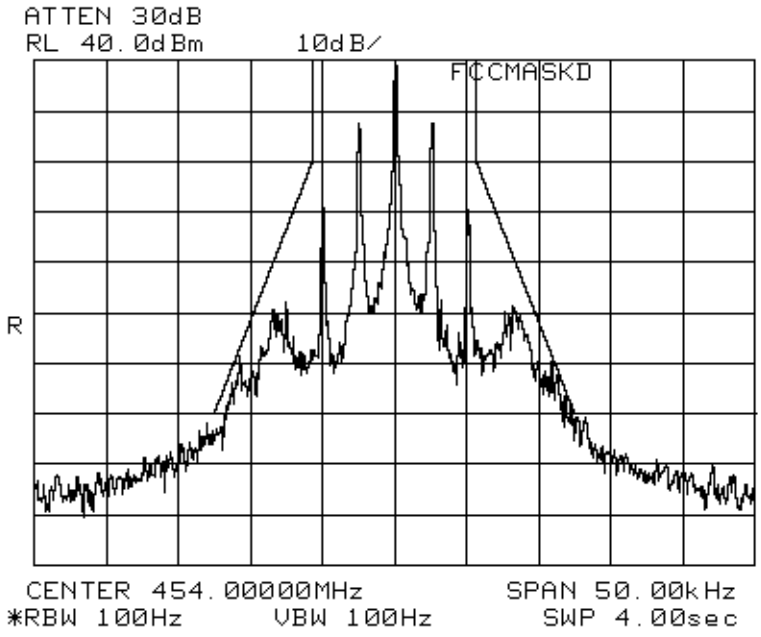
Minimum Standard: Mask B, D

Test Results: Complies

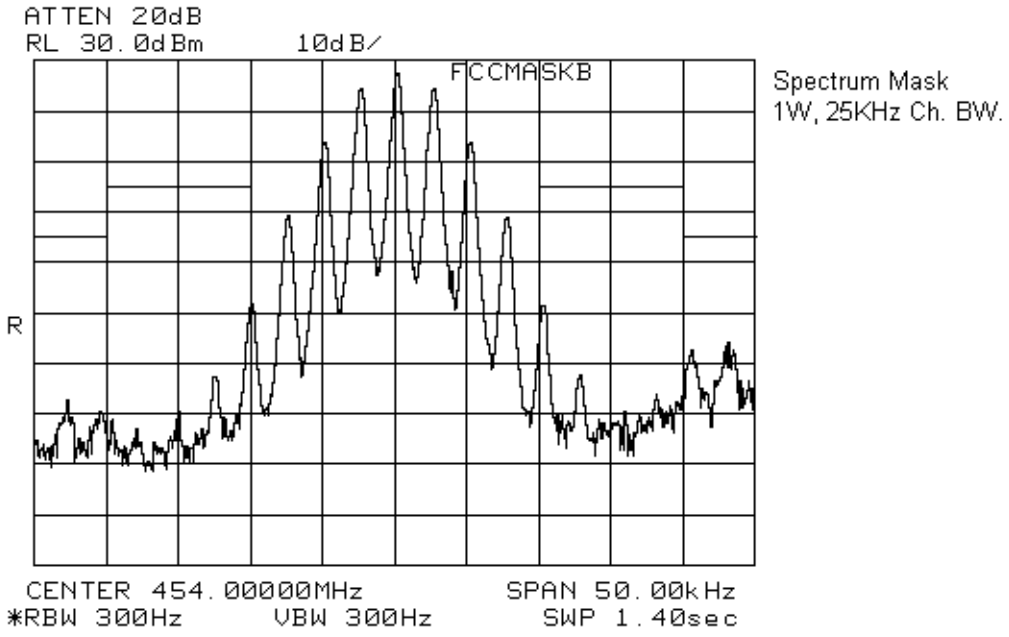
Measurement Data: See attached graphs.



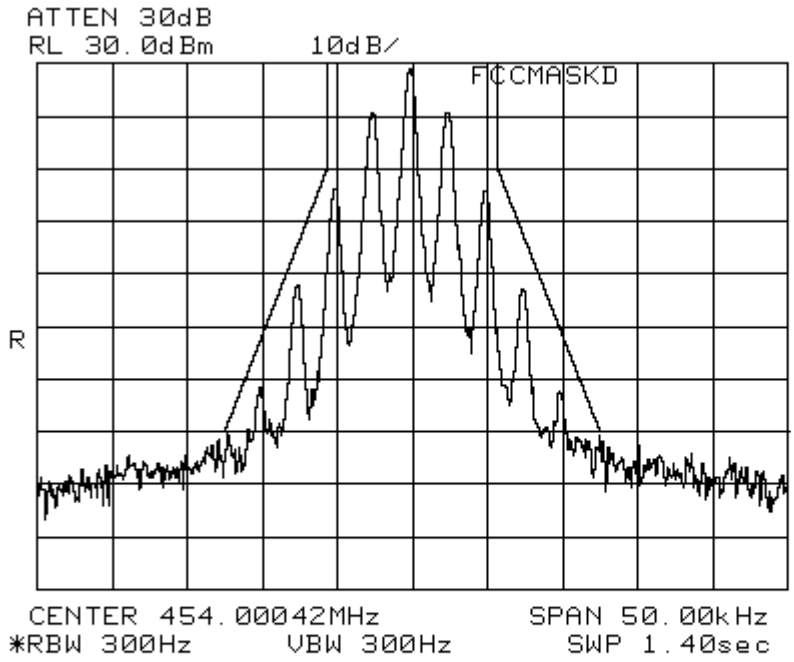
Spectrum Mask
10W, 25KHz Ch. BW.



Spectrum Mask
10W, 12.5KHz Ch. BW.



Spectrum Mask
1W, 25KHz Ch. BW.



Spectrum Mask
1W, 12.5KHz Ch. BW.

Section 7. Spurious Emissions at Antenna Terminals

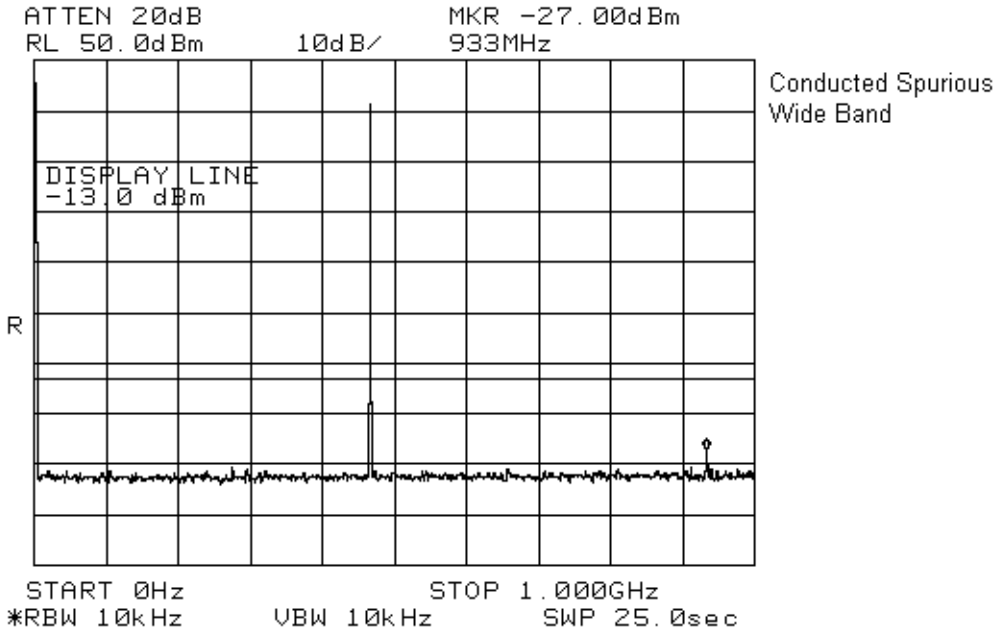
Para. No.: 2.1051

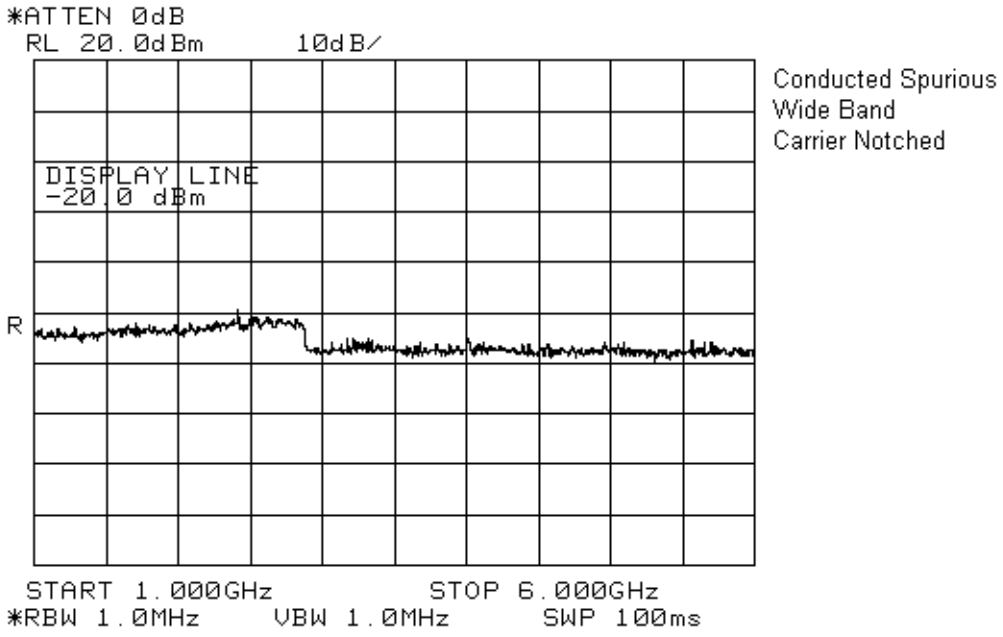
Test Performed By: Glen Westwell	**Date of Test: Jan 9, 2003**

Minimum Standard: -13 dBm

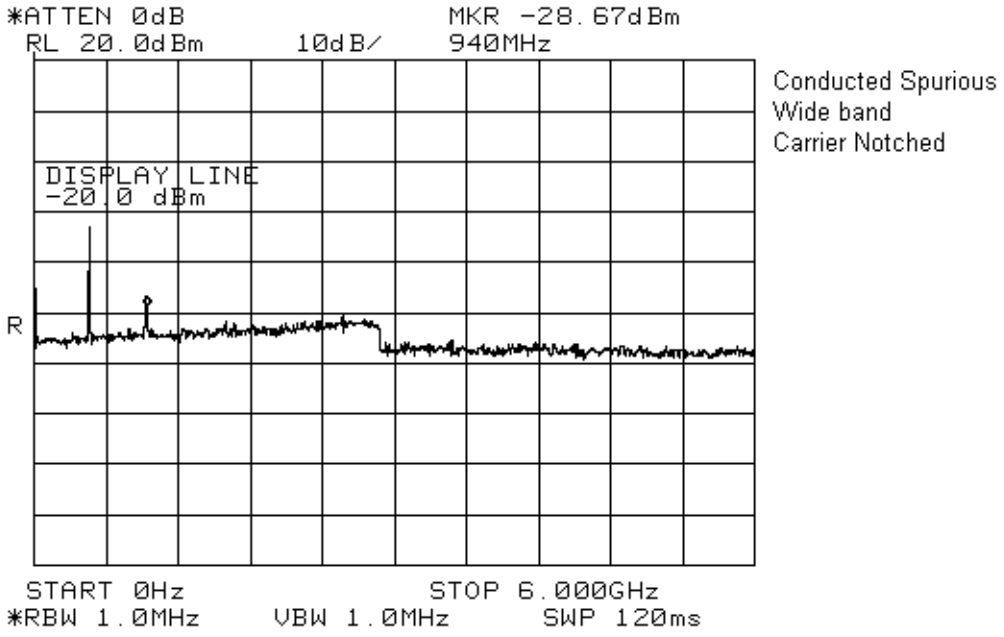
Test Results: Complies

Measurement Data: See attached graph.

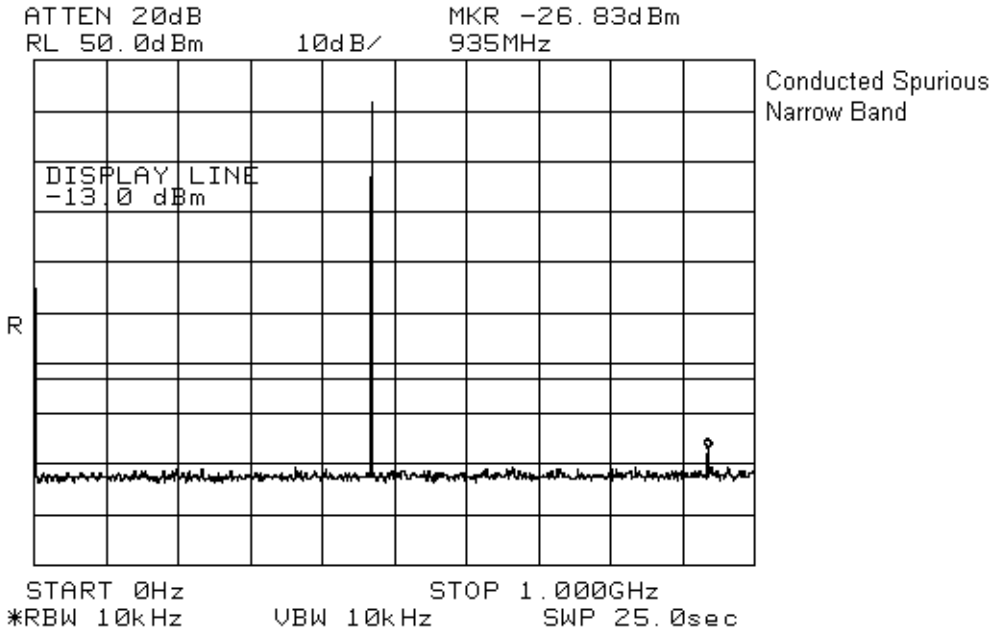

ATTEN 20dB
RL 50.0dBm
10dB/
MKR -27.00dBm
933MHz
Conducted Spurious
Wide Band
DISPLAY LINE
-13.0 dBm
R
START 0Hz
STOP 1.000GHz
*RBW 10kHz
VBW 10kHz
SWP 25.0sec

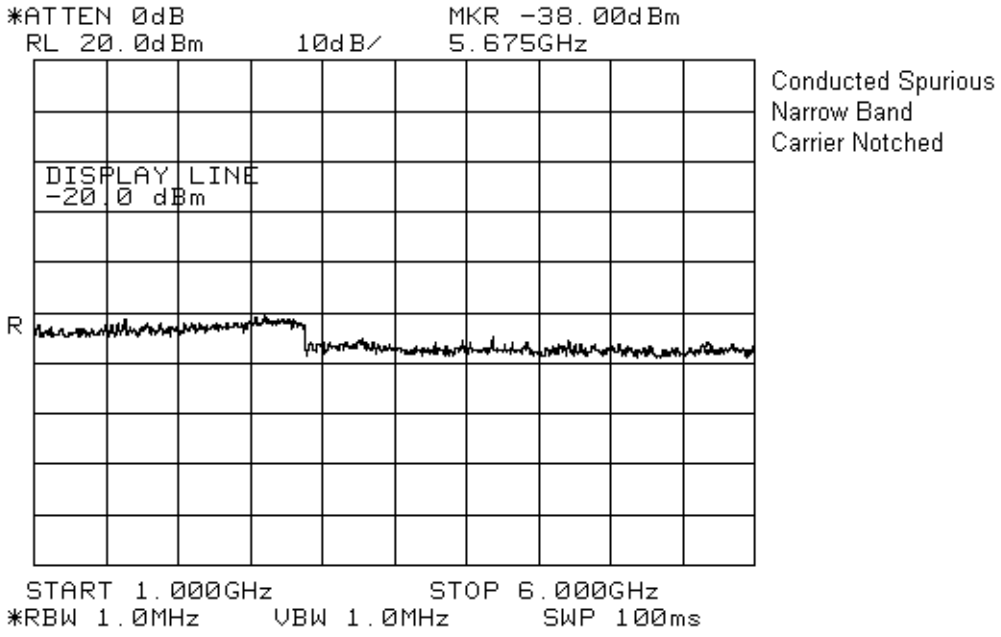


Conducted Spurious
Wide Band
Carrier Notched

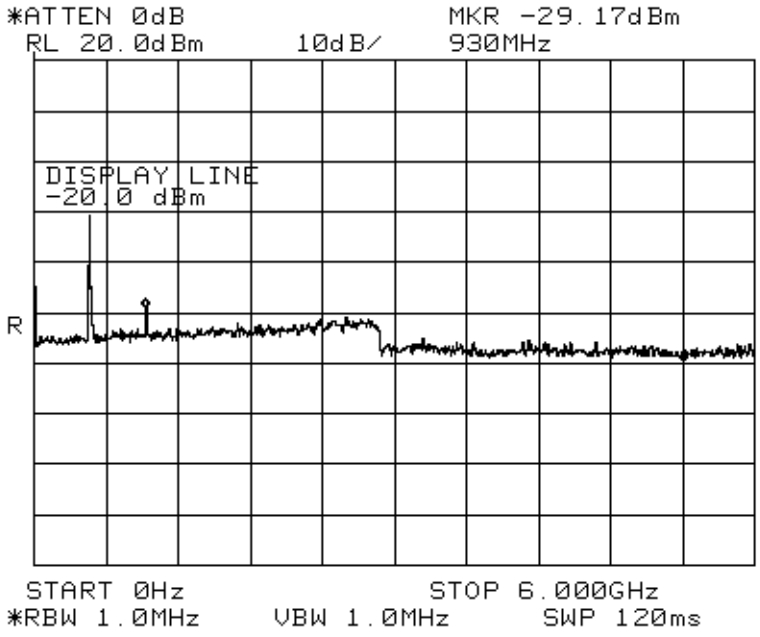


Conducted Spurious
Wide band
Carrier Notched


ATTEN 20dB
RL 50.0dBm
10dB/
MKR -26.83dBm
935MHz
Conducted Spurious
Narrow Band
DISPLAY LINE
-13.0 dBm
R
START 0Hz
STOP 1.000GHz
*RBW 10kHz
VBW 10kHz
SWP 25.0sec



Conducted Spurious
Narrow Band
Carrier Notched



Conducted Spurious
Narrow Band

Section 8. Field Strength of Spurious Emissions

Para. No.: 2.1053

Test Performed By: Glen Westwell	**Date of Test: Jan 8, 2003**

Minimum Standard: -13 dBm

Test Results: Complies

Measurement Data: See attached tabulated data.

Frequency (MHz)	Antenna	Polarity	RCVD Signal (dBuV)	Ant. Factor (dB)	Sig. Sub. Factor	Amp. Gain (dB)	Duty Cycle Corr.	Cable Loss (dB)	Emission Level. (dBm)	Limit (dBm)	Margin (dB)
908.0000	LP1	V	38.0		-67.6			4.0	-25.6	-13.0	12.6
908.0000	LP1	H	36.5		-73.7			4.0	-33.2	-13.0	20.2
1362.0000	Horn2	V	79.3		-120.9			2.9	-38.6	-13.0	25.6
1362.0000	Horn1	H	78.3		-121.3			2.9	-40.1	-13.0	27.1
1816.0000	Horn2	V	75.7		-119.1			3.8	-39.6	-13.0	26.6
1816.0000	Horn2	V	74.8		-119.1			3.8	-40.5	-13.0	27.5
2270.0000	Horn2	V	110.0		-128.4			4.6	-13.9	-13.0	0.9
2270.0000	Horn2	H	111.0		-129.3			4.6	-13.7	-13.0	0.7
2724.0000	Horn2	V	72.7		-127.5			5.4	-49.4	-13.0	36.4
2724.0000	Horn2	H	77.7		-128.9			5.4	-45.8	-13.0	32.8
3178.0000	Horn2	V	71.2		-125.7			6.7	-47.8	-13.0	34.8
3178.0000	Horn2	H	76.7		-126.6			6.7	-43.2	-13.0	30.2
3632.0000	Horn2	V	64.0		-125.0			5.9	-55.1	-13.0	42.1
3632.0000	Horn2	H	69.7		-126.6			5.9	-51.0	-13.0	38.0
4086.0000	Horn2	V	71.0		-119.7			6.9	-41.8	-13.0	28.8
4086.0000	Horn1	H	74.2		-119.5			6.9	-38.4	-13.0	25.4
4540.0000	Horn2	V	79.8		-120.6			7.2	-33.6	-13.0	20.6
4540.0000	Horn2	H	84.5		-121.2			7.2	-29.5	-13.0	16.5

All spurious and harmonic emissions were searched to the 10th harmonic.

OATS Set-up Photo

Section 9. Frequency Stability

Para. No.: 2.1055

Test Performed By: Glen Westwell	**Date of Test: Jan 9, 2003**

Minimum Standard: 2.5ppm (1135Hz)

Test Results: Complies.

The maximum frequency drift is 370Hz.
This is 0.82ppm.

Measurement Data: Standard Test Voltage: STV: 27.5Vdc
Standard Test Freq: 454 000.000KHz

Test Condition	Frequency (MHz)	Frequency Drift (Hz)
STV	454. 000 050	50
115% STV	454. 000 049	49
85% STV	454. 000 .050	50
-30 °C	453. 999 630	370
-20 °C	454. 000 010	10
-10 °C	454. 000 269	269
0 °C	454. 000 223	223
+10 °C	454. 000 191	191
+30 °C	454. 000 005	5
+40 °C	454. 000 010	10
+50 °C	454. 000 020	20

Section 10. Transient Frequency Behavior

Para. No.: N/A

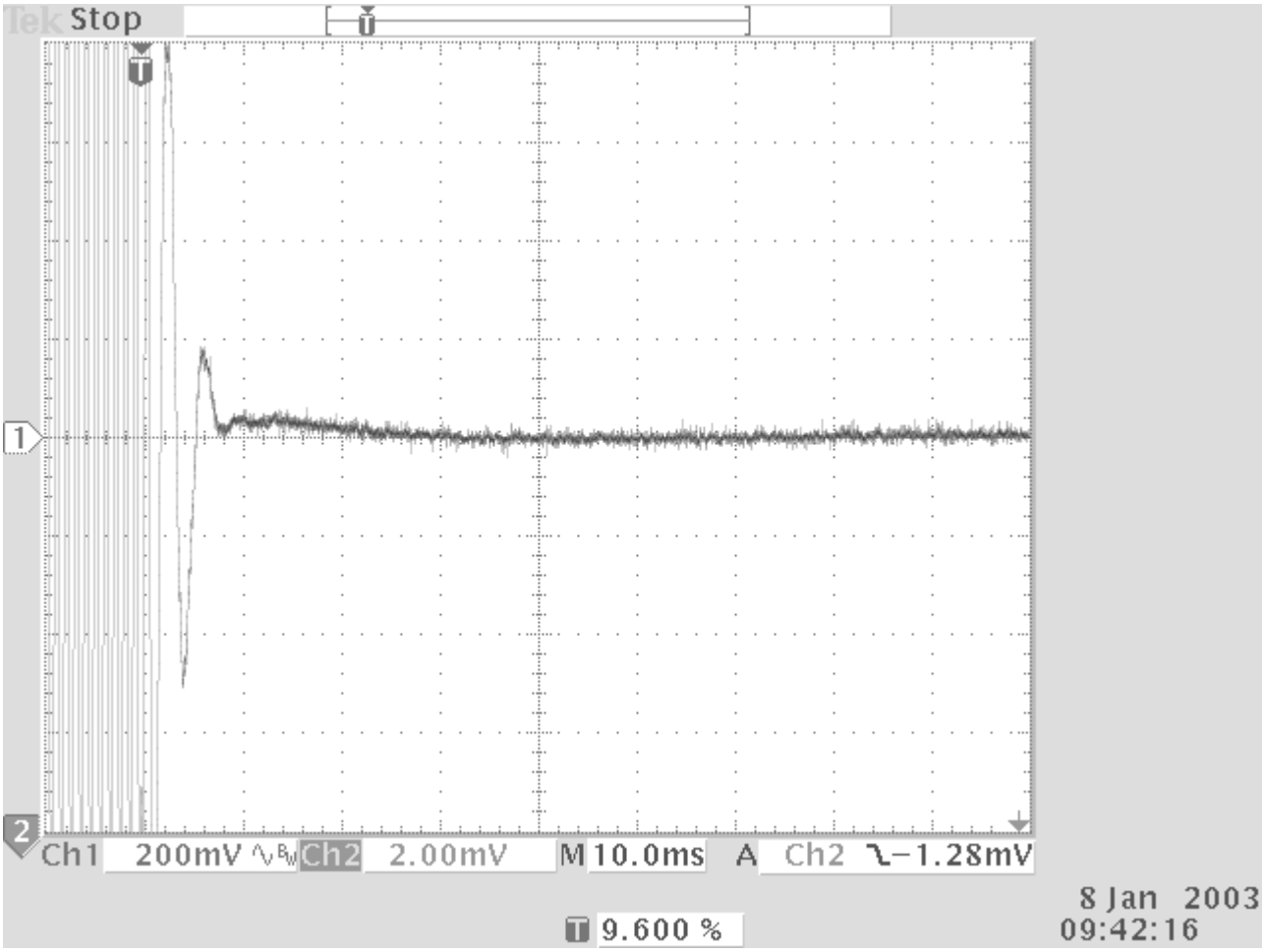
Test Performed By: Glen Westwell	**Date of Test: Jan 7, 2003**

Minimum Standard: 90.214

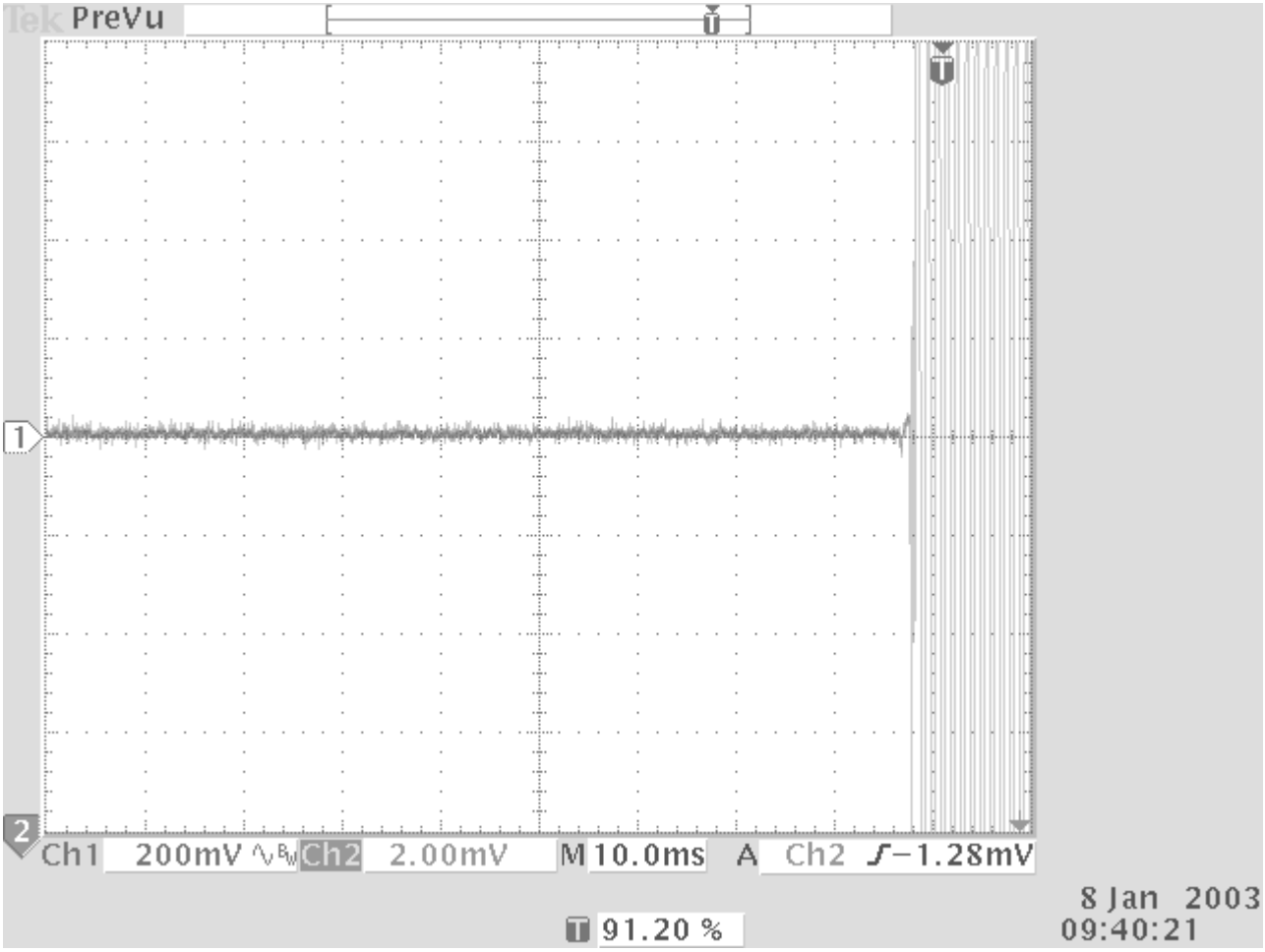
Test Results: Complies

Measurement Data: **See attached graphs.**

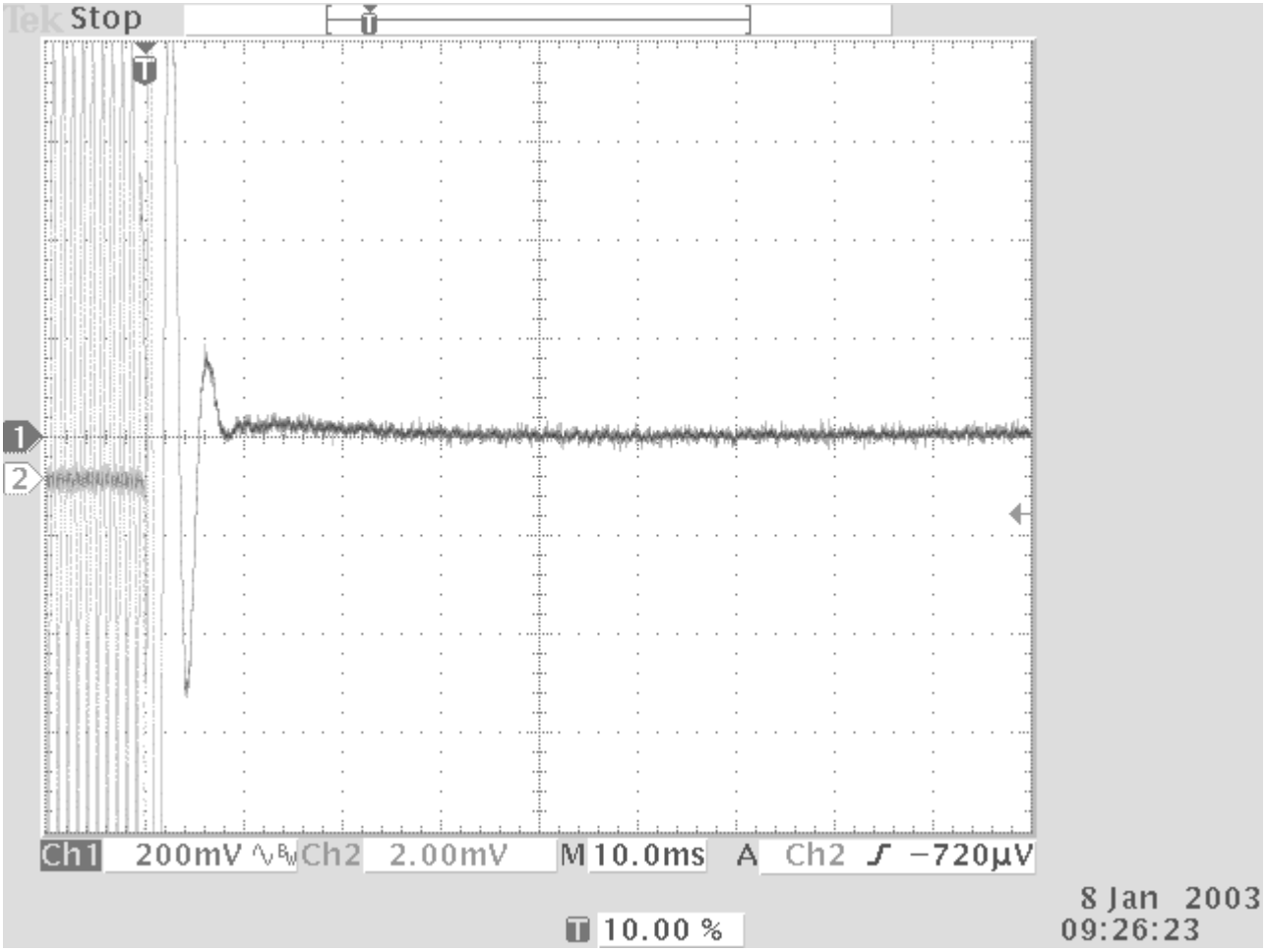
25KHz Channels



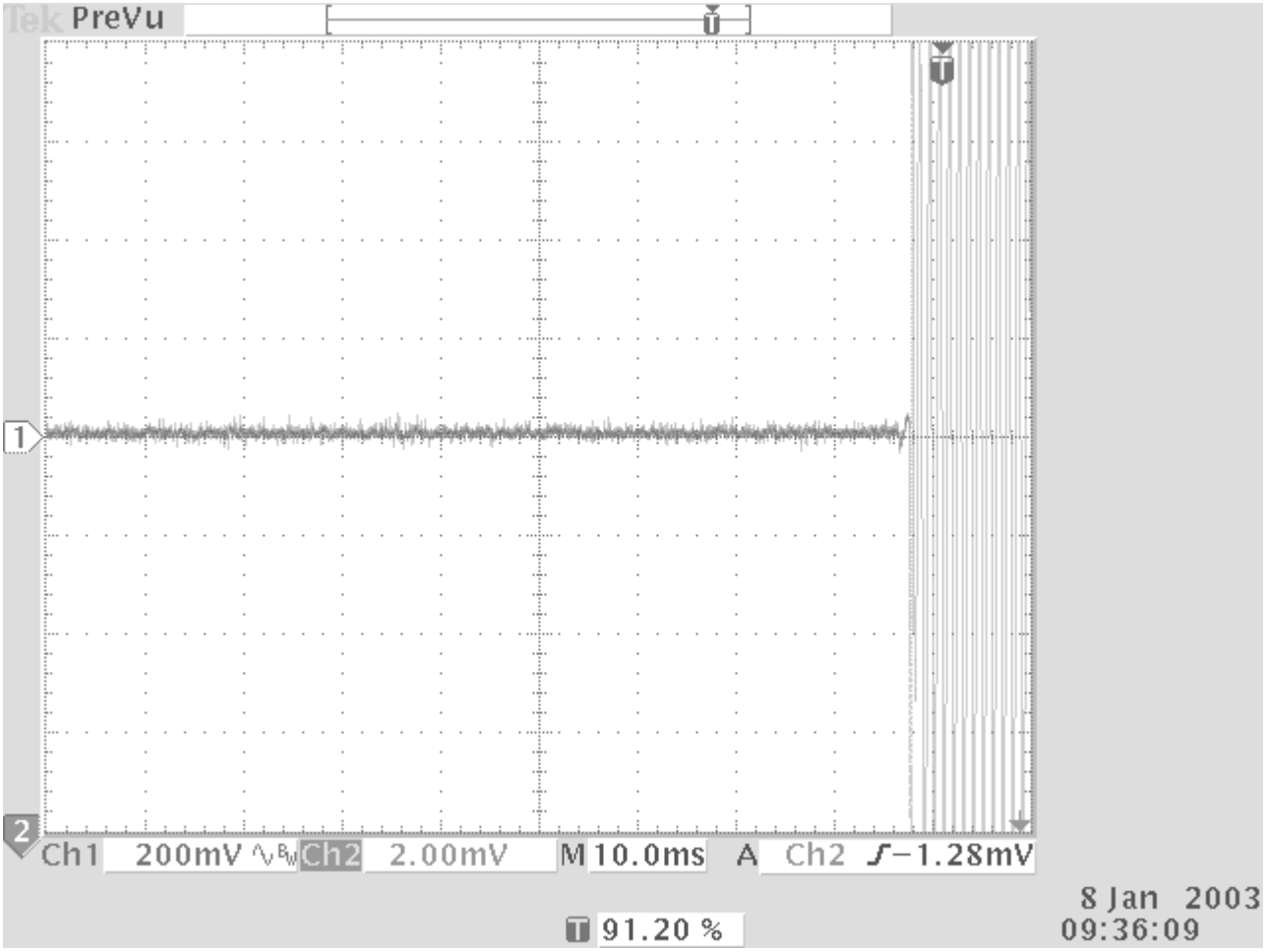
25KHz Channels



12.5KHz Channels



12.5KHz Channels



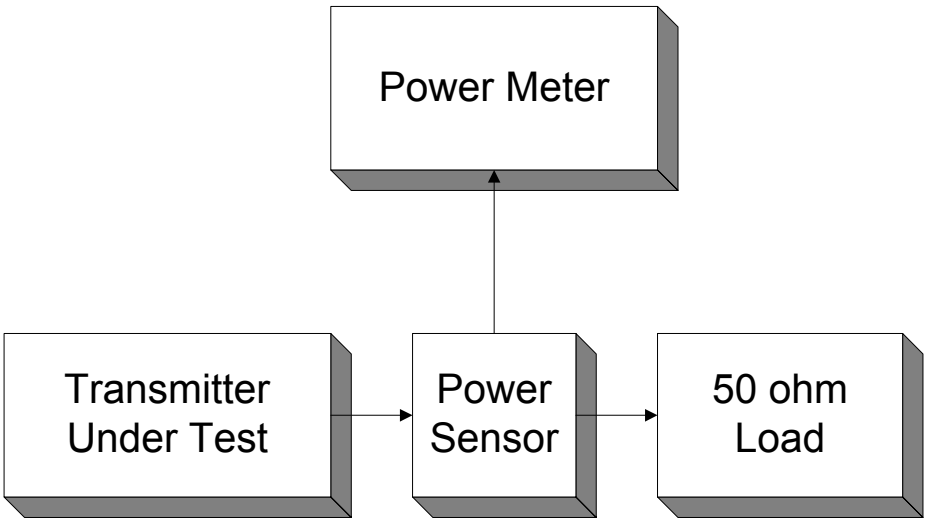
Section 11. Test Equipment List

RADIO TEST EQUIPMENT LIST

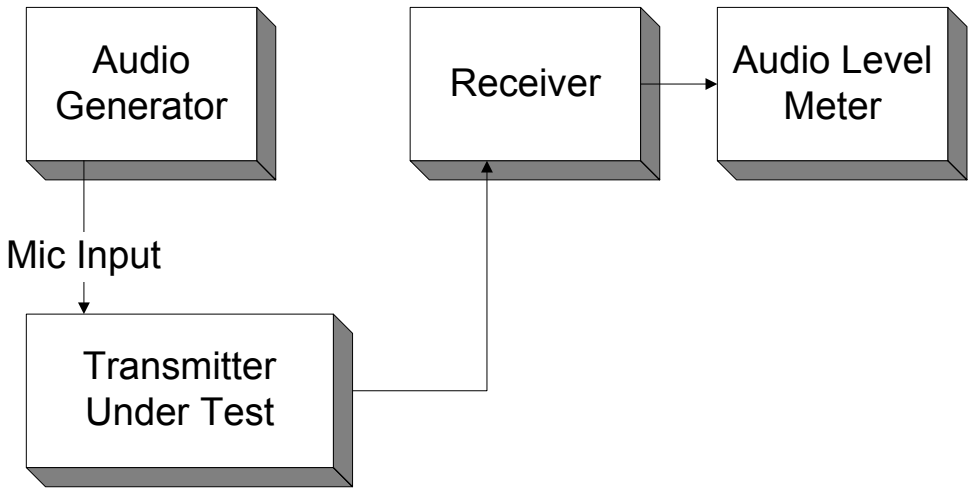
CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	Last Cal.	Next Cal.
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981	15 July 02	15 July 03
1 Year	Radio Communications	Rohde & Schwarz	CMTA 54	840343/013	23 Oct 02	23 Oct 03
1 Year	Climate Chamber	Thermotron	SM-16C	15649-S	16 Jan 03	16 Jan 04
COU	Power Supply	Astron	VS-50M	8405071	COU	COU
1 Year	Attenuator	Narda	768-20	9507	COU	COU
1 Year	Attenuator	Narda	769-20	4153	COU	COU
3 Year	RF Millivoltmeter	Rohde & Schwarz	URV5	FA001570	3 July 02	3 July 03
3 Year	Insertion Unit	Rohde & Schwarz	URV5-Z4	FA000905	3 July 02	3 July 03
1 Year	Receiver	Rohde & Schwarz	ESVP	892661/014	15 Nov 02	15 Nov 03
1 Year	Horn Antenna	EMCO #2	3115	4336	9 Dec 02	9 Dec 03
1 Year	Horn Antenna	EMCO #1	3115	3132	23 Dec 02	23 Dec 03
1 Year	Dipole Antenna Set	EMCO #2	3121C	FA001349	6 May 02	6 May 03
1 Year	50 ohm Combiner Pad	Mini Circuits	ZFC-3-4	922603	COU	COU
3 Year	Signal Generator	Rohde & Schwarz	SM1Q03	DE22004	18 Sept 00	18 Sept 03
1Year	Frequency Counter	Hewlett Packard	HP5350A	2444A00135	11 Jan 02	11 Apr 03
1 Year	RF AMP	JCA	2-4 GHz	FA001496	4 Jun 02	4 Jun 03
1 Year	RF AMP	JCA	1-2 GHz	FA001498	4 Jun 02	4 Jun 03
1 Year	RF AMP	JCA	4-8 GHz	FA001497	4 Jun 02	4 Jun 03

Section 12. Test Diagrams

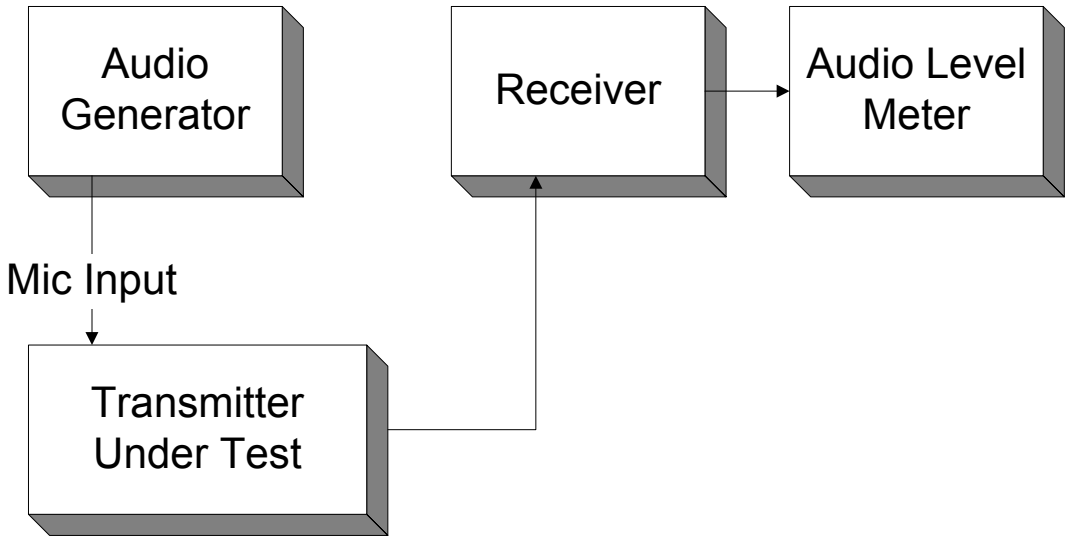
Para. No. 2.1046 - R.F. Power Output



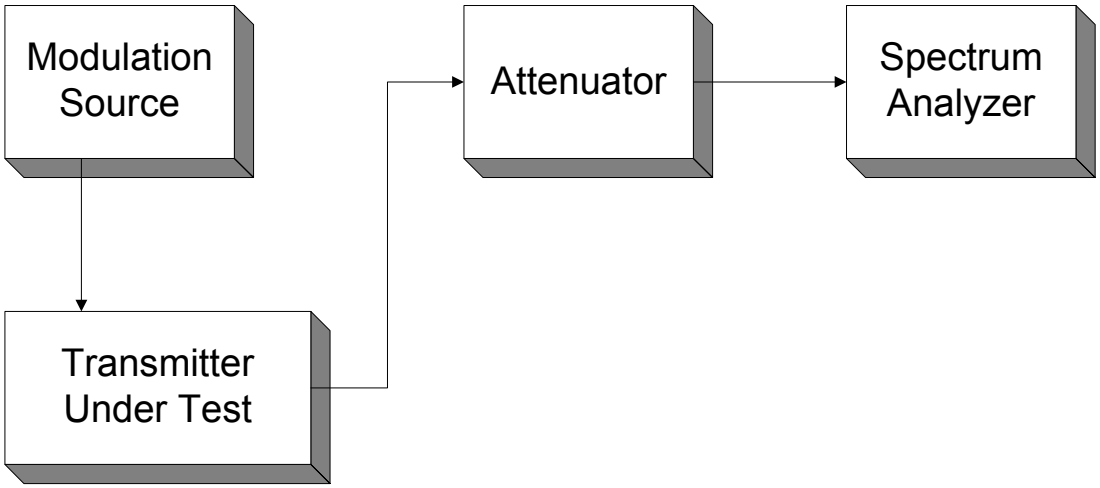
Para. No. 2.2.1047 - Audio Frequency Response



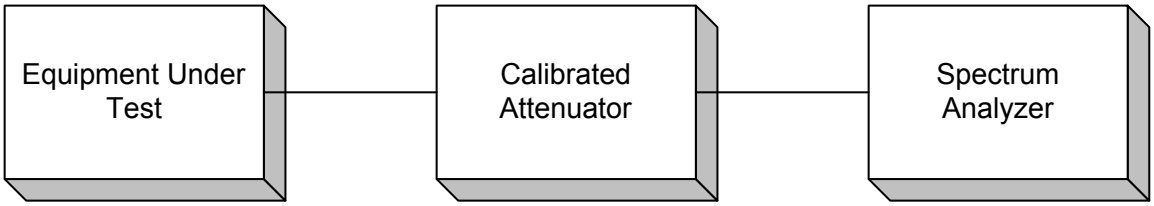
Para. No. 2.1047 - Modulation Limiting



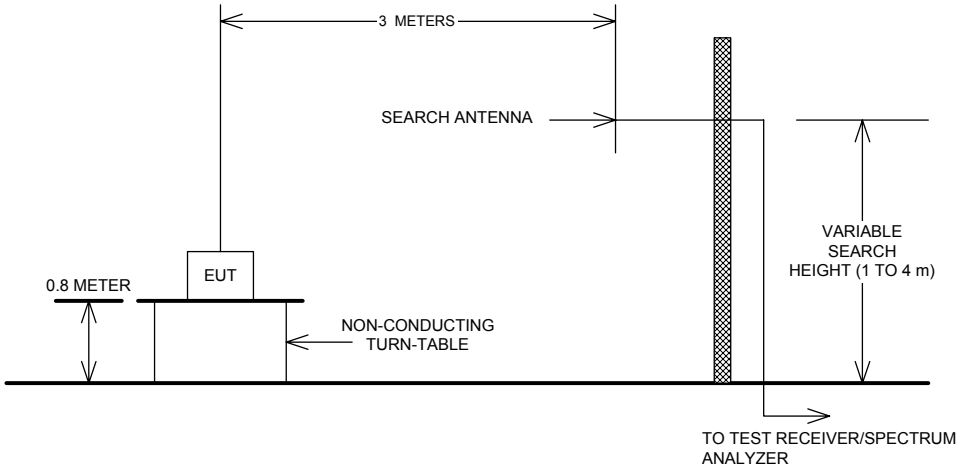
Para. No. 2.1049 - Occupied Bandwidth



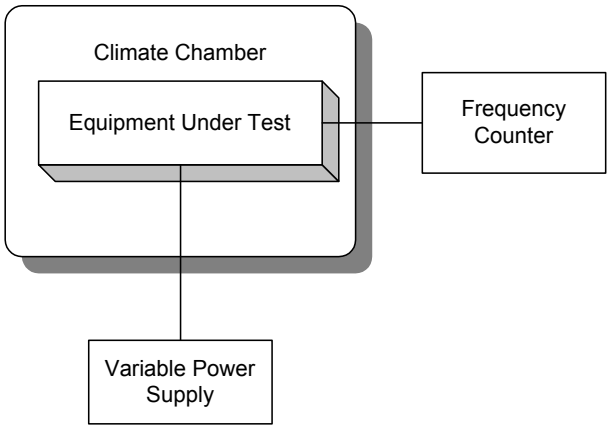
Para. No. 2.1051 - Spurious Emissions at Antenna Terminals



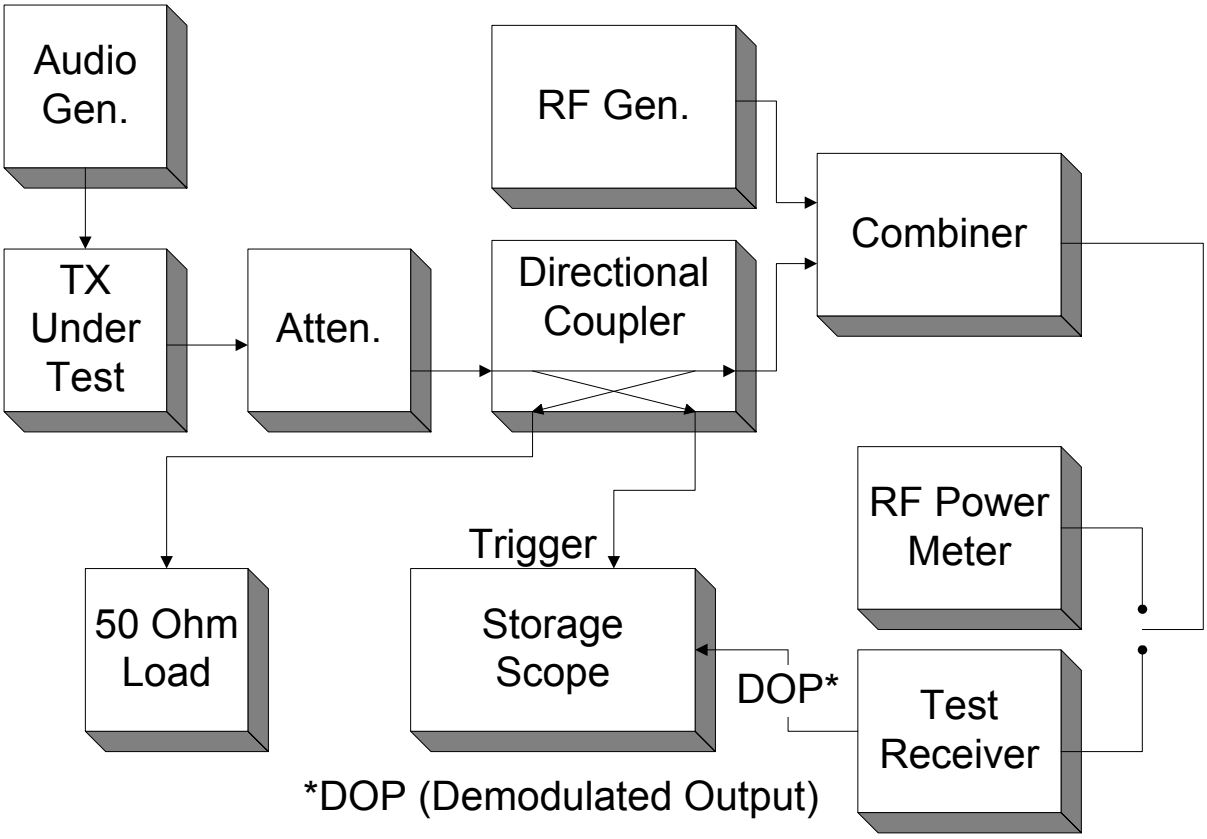
Para. No. 2.1053 - Field Strength of Spurious Radiation



Para. No. 2.1055 - Frequency Stability



Transient Frequency Behavior



Voice

This measurement was made using measurement procedure TIA/EIA Land Mobile FM or PM Communications Equipment Measurement and Performance Standards TIA/EIA-603 February 1993 Telecommunications Industry Association (American National Standard ANSI/TIA/EIA-603-1992 Approved: October 27, 1992) Para. no. 2.2 Methods of Measurement for Transmitters Para. no. 2.2.19 Transient Frequency Behaviour (page no. 83).

Data

This measurement was made using measurement procedure TIA/EIA Digital C4FM/CQPSK Transceiver Measurement Methods TSB102.CAAA Para. no. 2.2.17 Transient Frequency Behaviour (page no. 74).